

# MISSOURI. Conservationist

VOLUME 75, ISSUE 7, JULY 2014 • SERVING NATURE & YOU



# Ensuring the Health of Missouri's Deer Herd

More than 500,000 Missourians enjoy deer hunting, sharing their hunting heritage, and passing that heritage on to future generations. Missourians consume millions of pounds of venison and share with neighbors in need through the Share the Harvest Program. The spread of chronic wasting disease (CWD) could negatively impact deer-dependent businesses that support more than 12,000 Missouri jobs and generate more than \$1 billion in economic activity annually. The Department is committed to taking action to ensure the long-term health of our state's deer herd.

Chronic wasting disease is a fatal disease that affects members of the deer family. It is different and unrelated to the recent outbreak of hemorrhagic diseases. Those diseases — blue tongue and epizootic hemorrhagic disease — are caused by viruses. Their effects are short-term and localized, and they are often not fatal. Hemorrhagic diseases have been in Missouri for years, and the white-tailed deer population can cope with them, in spite of temporary setbacks.

At its June meeting, the Conservation Commission voted to approve proposed amendments to the *Wildlife Code of Missouri* regarding the operation of Department-licensed big game hunting preserves and wildlife breeding facilities that hold white-tailed deer, mule deer, their hybrids, and other members of the deer family, known as cervids. These proposed changes for captive deer are a necessary part of the agency's strategy, building upon regulations already implemented in 2011 to help minimize disease concerns in Missouri's free-ranging white-tailed deer and ensure the long-term health of our state's valued deer herd.

Individual landowners and citizens from several different organizations representing thousands of Missourians delivered testimony at the June Commission meeting. All comments received voiced strong support for advancing the proposed amendments for captive operations to address existing areas of concern, including: CWD and other diseases, fencing standards, cervid movement/shipping, and testing requirements.

Currently, Missouri has approximately 40 big-game hunting preserves and 220 wildlife breeders licensed to hold captive white-tailed deer. Cumulatively, these locations report holding 9,000 white-tailed deer. Industry-provided records indicate that more than 200 licensed captive wildlife breeders hold fewer than 50 deer, while only eight hold more than 100 white-tailed deer. While the number of captive white-tailed deer is small in size compared to Missouri's free-ranging deer herd of 1.4 million, appropriate regulations are essential as captive deer are often moved across Missouri and from other states, increasing the risk of spreading disease.

Proposed amendments approved by the Commission include:

- A ban on importation of live white-tailed deer, mule deer, and their hybrids from other states.
- Enhanced fencing standards for captive cervid facilities.
- A requirement for all deer 6 months or older that die in a Conservation Department-licensed facility to be tested for CWD.
- Improved record keeping requirements for Conservation Department-licensed captive cervid facilities.
- Prohibition of construction of new captive cervid facilities within 25 miles of a facility where a CWD-positive test has been confirmed.

These proposed amendments to the *Wildlife Code* are the result of nearly two years of extensive review, citizen input, and stakeholder engagement. They work to reduce the risk of the always-fatal chronic wasting disease spreading beyond the limited area where it has been found, while minimizing the economic impact on the licensed captive-cervid industry and the communities and businesses that benefit from deer hunting and deer-related activities.

Stated another way, these proposed amendments are designed to ensure Missouri's deer hunting heritage and to ensure future generations of Missourians can enjoy our abundant white-tailed deer resource. The Department believes these steps are needed to better protect Missouri's deer herd.

A formal 30-day public comment period, during which any citizen can provide additional input and perspectives, is anticipated to start on July 16. Our agency will compile and provide comments received to the Commission for consideration. Following the public comment period, the Commission will vote to adopt, amend, or withdraw the changes.

The Conservation Commission emphasized the importance of an informed, involved public to ensure the health of Missouri's deer herd both now and in the future. Details of the proposed amendments, along with a video presentation shown at the meeting, are available at [mdc.mo.gov/node/28400](http://mdc.mo.gov/node/28400).

Given the importance of this topic, I ask all citizens to become informed on proposed amendments, to engage, and to provide comments to the Department. The Department wants to hear from you. Comments can be submitted online at [mdc.mo.gov/deerhealth](http://mdc.mo.gov/deerhealth) or on the comment card attached to this issue of the *Conservationist*.



Robert L. Ziehmer, director

## FEATURES

### II **Missouri Deer Hunting: Opportunity for All**

*by Sarah Kendrick*

Each year, deer hunters with disabilities and volunteers from across the state reunite to share laughs, stories, and hunt deer.

### 16 **Emeralds of the Ozarks**

*by Bob Gillespie, photographs by Richard Day*

Rare and beautiful dragonflies of Missouri

### 22 **Catfishing Missouri's Big Rivers**

*by Ross Dames and Mike Reed, photographs by David Stonner*

Learn to navigate and fish the Missouri and Mississippi rivers.

Cover: A female Hine's emerald dragonfly at Kay Branch Fen in Reynolds County, by Richard Day. Read more about Missouri's emeralds starting on Page 16.

📷 180mm lens • f/4.0 • 1/250 sec • ISO 320

## DEPARTMENTS

2 **Letters**

4 **Hunting and Fishing Calendar**

4 **Agent Notes**

5 **Ask the Ombudsman**

6 **News & Events**

30 **Plants & Animals**

32 **Places to Go**

33 **Discover Nature**

## WHAT IS IT?

Our photographers have been busy exploring the intricacies of the Missouri outdoors. See if you can guess this month's natural wonder. The answer is revealed on Page 8.





## CHECK OUT A FAVORITE

Jim Low, you created one of the best yet with your informative commentary and wonderful photographs [May; *Browsing Nature's Library*]. Please continue your contributions after you retire. Made me say to myself, "I need to get going." Had to write and say thanks.

Mark Rost, Shawnee, Kansas

## PLACES TO GO ALL YEAR

I love the short one-page articles on the natural areas. Please do this more as we now know which direction to head next. As always, the photos are fantastic! The only thing that I might have liked in each natural area article would be a small drawing of the state with a star to show where that area is located.

Linda Jager, Cedar Hill

*Editors' Note: We have some good news for you: "Places to Go" currently runs every month on Page 32, and, if you look to the bottom of the page, you will find the very map you suggested. Our design may have made the map appear to belong to another feature, so we appreciate the feedback. We will review that for future issues.*

## HANDLE WITH CARE

Andrew Branson's article *Fishing for Beginners* was excellent. However, the photo that appeared on Page 15 should have shown the person removing the hook from the fish without touching the fish (assuming it's catch and release) since children should learn early that fish have a protective slime covering them that protects them from disease. When we touch a fish with our hands we

tend to remove that slime and, when returned to the water, the fish is more susceptible to contracting a disease. The best way to remove the hook is by using a pair of needle-nose pliers but attaching the pliers to the hook and jiggling it so that the fish jiggles free and plops back into the water, untouched by human hands.

Marv Fremmerman

Outdoor Wilderness Adventures, Springfield

## PRIVATE TREE CHAMPS

I read about the new champion black maple in the May issue [*Champion Black Maple Found in Harrison County*; Page 9]. Would you please email me the location so I can go see it?

Jack Stoerman, Olathe, Kansas

*Ombudsman's Note: Unfortunately, we are unable to share the location of the tree. Because that state champion tree is on privately owned land, we do not give out directions for persons wishing to visit it.*

*We appreciate that private land-owners participate in the program to recognize the state's largest trees. The designation does not include any agreement by the owner for public access to private land. —Tim Smith*

## WILD, TASTY RECIPES

I enjoyed the short article *Hefty Spoonbills Await Snaggers* [March; Page 6], however, I'd actually like to know how to cook them! A small recipe would be nice as well.

Dana J. Pelletier, St. Charles

*Editors' Note: You can find a wide array of recipes and cooking videos on the Department's "Cooking" page at [mdc.mo.gov/node/3500](http://mdc.mo.gov/node/3500). Don't miss the recipe and video for Three-Alarm Spoonbill Jambalaya!*

## CORRECTION

The June "What is It?" segment, Page 8, said that the nine-banded armadillo will curl into a ball when cornered. However, though there are armadillo species that can curl into a ball, such as the three-banded armadillo of South America, our Missouri species is not one of them.



## Reader Photo

## BEAVER BUSINESS

Rick Shults, of Salem, captured this photo of a beaver at Montauk State Park. "I live just a few minutes from the park, so I'm down there a lot," said Shults. "I love to shoot landscapes and wildlife. Montauk is the honey-hole, so to speak, in my backyard." Shults said that he takes his camera with him whenever he goes hunting or anytime he goes out in the woods. "I spend a lot of time down along the Current River between Montauk and Akers Ferry," said Shultz. Shultz took the photo behind the old hatchery building at the park. "I had gone down there well before daylight to get to the area where I had known the beavers tend to be," said Shults. "I was able to make my way to around 25 yards or so from it and got this. Once it got the limb cut, it took off for its lodge, and that was the last that I saw of it that morning."



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**Conservationist online services:** Subscribe to the magazine, update your mailing address, or sign up to receive an email when the latest issue is available online at [mdc.mo.gov/node/9087](http://mdc.mo.gov/node/9087)

**Cost of subscriptions:** Free to Missouri households

Out of State \$7 per year

Out of Country \$10 per year

Please allow 6-8 weeks for delivery of your first issue.

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Discover more about nature and the outdoors through these sites.

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Kids' site: [XplorMo.org](http://XplorMo.org)

Missouri Conservationist: [mdc.mo.gov/node/83](http://mdc.mo.gov/node/83)

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The Missouri Conservationist (ISSN 0026-6515) is the official monthly publication of the Missouri Department of Conservation, 2901 West Truman Boulevard, Jefferson City, MO (Mailing address: PO Box 180, Jefferson City, MO 65102.) Subscription free to adult Missouri residents; out of state \$7 per year; out of country \$10 per year. Notification of address change must include both old and new address (send mailing label with the subscriber number on it) with 60-day notice. Preferred periodical postage paid at Jefferson City, Mo., and at additional entry offices. Postmaster: Send correspondence to Circulation, PO Box 180, Jefferson City, MO 65102-0180. Phone: 573-522-4115, ext. 3856 or 3249. Copyright © 2014 by the Conservation Commission of the State of Missouri.

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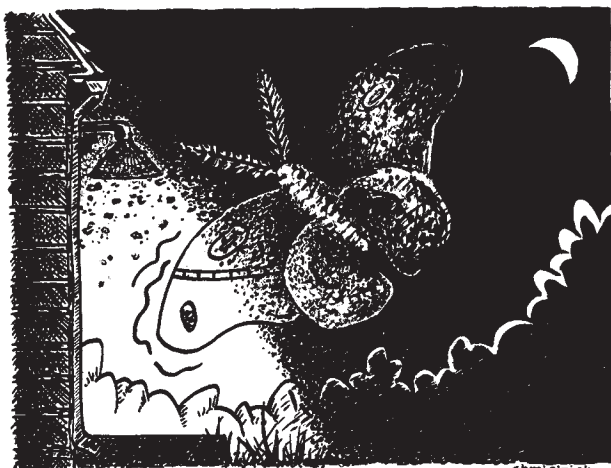
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Behemoth

## Agent Notes

### *Safety Starts With Respect*

THE MISSOURI DEPARTMENT of Conservation recently adopted a new skills portion for the Hunter Education program. This program is taught by conservation agents, outdoor skills specialists, other Department staff, and volunteers. A majority of the information is taught through a hands-on approach and application of the skills learned. By emphasizing proper techniques for handling a firearm, participants learn to respect the firearm. Successfully completing this course will help you handle a firearm in a safe manner.

Since the inception of the Hunter Education program there has been a steady decline in firearm-related hunting incidents. One of the most important concepts taught in the Hunter Education program is the Golden Rule: "Always keep the muzzle pointed in a safe direction." Keeping the muzzle pointed in a safe direction will prevent a hunting incident from happening. Remember that once a bullet is fired, there is no way to take it back.

Tips for staying safe while hunting include positively identifying your target and knowing what is beyond the target before even raising the firearm to take aim. There is no age restriction for safety, and hunters of all ages are encouraged to take the course.

For more information on hunter education and courses near you, as well as tips for staying safe while hunting, visit [mdc.mo.gov/node/3095](http://mdc.mo.gov/node/3095), or call your local regional office (phone numbers on Page 3). Remember, hunter safety begins with you.

*Leother Branch, Jr. is the conservation agent for Scott County. If you would like to contact the agent for your county, phone your regional conservation office listed on Page 3.*



## HUNTING AND FISHING CALENDAR

FISHING	OPEN	CLOSE
Black Bass from Ozark Streams	05/24/14	02/28/15
Bullfrogs and Green Frogs	Sunset	Midnight
	06/30/14	10/31/14
Nongame Fish Giggling	09/15/14	01/31/15
Paddlefish on the Mississippi River	09/15/14	12/15/14
Trout Parks	03/01/14	10/31/14
HUNTING	OPEN	CLOSE
Coyote	05/12/14	03/31/15
Deer		
Archery	09/15/14	11/14/14
	11/26/14	01/15/15
Firearms		
Urban Portion	10/10/14	10/13/14
Early Youth Portion	11/01/14	11/02/14
November Portion	11/15/14	11/25/14
Antlerless Portion (open areas only)	11/26/14	12/07/14
Alternative Methods Portion	12/20/14	12/30/14
Late Youth Portion	01/03/15	01/04/15
Doves	09/01/14	11/09/14
Groundhog (woodchuck)	05/12/14	12/15/14
Pheasant		
Youth	10/25/14	10/26/14
North Zone	11/01/14	01/15/15
Southeast Zone	12/01/14	12/12/14
Quail		
Youth	10/25/14	10/26/14
Regular	11/01/14	01/15/15
Rabbit	10/01/14	02/15/15
Sora and Virginia rails	09/01/14	11/09/14
Squirrel	05/24/14	02/15/15
Turkey		
Archery	09/15/14	11/14/14
	11/26/14	01/15/15
Firearms		
Fall	10/01/14	10/31/14
Waterfowl	see the <i>Waterfowl Hunting Digest</i> or <a href="http://mdc.mo.gov/node/3830">mdc.mo.gov/node/3830</a>	
Wilson's (common) snipe	09/01/14	12/16/14
Woodcock	10/15/14	11/28/14
TRAPPING	OPEN	CLOSE
Beaver and Nutria	11/15/14	03/31/15
Furbearers	11/15/14	01/31/15
Otters and Muskrats	11/15/14	02/20/15

For complete information about seasons, limits, methods, and restrictions, consult the *Wildlife Code* and the current summaries of *Missouri Hunting and Trapping Regulations* and *Missouri Fishing Regulations*, *The Spring Turkey Hunting Regulations and Information*, *the Fall Deer and Turkey Hunting Regulations and Information*, *the Waterfowl Hunting Digest*, and *the Migratory Bird Hunting Digest*. For more information visit [mdc.mo.gov/node/130](http://mdc.mo.gov/node/130) or permit vendors.

ASK  
THE

# Ombudsman



Gray squirrel

**Q.** I saw a gray squirrel in my yard today with a bird in its mouth. Do squirrels eat birds?

A. Yes, they do, although probably not very frequently. I have received a few questions over the years from persons who observed that behavior and were usually surprised to see it. It is more common for squirrels to raid bird nests for eggs or nestlings, but they have also been observed eating adult birds. I don't know whether they catch the adults or scavenge them when found dead. Ironically, squirrels themselves are subject to being eaten by larger birds, such as several species of hawks and owls. It's a squirrel-eat-bird-eat-squirrel world out there.

**Q.** I am an avid Missouri deer hunter, and I'm concerned about the current lower number of deer in my area. How can I influence the Department's decisions regarding deer management?

A. We are always happy to receive public input through our website, email, phone calls, letters, and scientific surveys of deer hunters and production landown-

ers. Comments on regulations are shared with members of our Regulations Committee and summarized for the Conservation Commissioners. As you are probably aware, several regulation changes will go into effect for the 2014–2015 deer season. Those are detailed in the free *2014 Fall Deer and Turkey Hunting Regulations and Information* booklet available in July at permit vendors statewide. A more thorough review of deer regulations and season structure is in progress. A series of open house meetings around the state for citizen input is a part of that process. July meetings will be held 3–8 p.m. on the following dates and at the following locations:

- **July 1: Chillicothe** — Litton Agriculture Campus, MW Jenkins Building, 10780 Liv 235
- **July 2: Lee's Summit** — Lakeland Community Church, 913 NE Colbern Road
- **July 7: Hannibal** — Quality Inn, Atlantis Ballroom, 120 Lindsey Drive

- **July 8: St. Joseph** — Missouri Western University, 218/219 Blum Union, 4525 Downs Drive
  - **July 9: Columbia** — Hilton Garden Inn, Magnolia Room, 3300 Vandiver
- Share your thoughts on limiting the spread of chronic wasting disease at [mdc.mo.gov/deerhealth](http://mdc.mo.gov/deerhealth).

**Q.** I've heard of fish dying in lakes and ponds from lack of oxygen.

**What causes low oxygen?**

A. The dissolved oxygen level in the water is affected by many factors including surface wind, water temperature, amount and type of vegetation in the water, time of day, water depth, and the amount of sunlight reaching the water. Sources of oxygen in the water are photosynthesis by plants, especially algae, and wind wave action at the water surface. Oxygen is lost during plant respiration at night. The decay of organic material such as aquatic plants and tree leaves also reduces the oxygen level. Fish kills are more common in summer and winter. During the summer, water is warmer and holds less oxygen. Excessive growth of aquatic plants on the water surface can lead to oxygen depletion by reducing sunlight that penetrates the water. Ice and snow cover can have a similar effect as wave action stops and the amount of light for photosynthesis is reduced. Ponds that are at least 8 feet deep are better able to maintain adequate levels of oxygen. For more information, see our Aquaguide titled *Fish Kills in Ponds and Lakes* at [go.usa.gov/KnBR](http://go.usa.gov/KnBR).

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*Ombudsman Tim Smith will respond to your questions, suggestions, or complaints concerning the Conservation Department.*  
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Hunters call for teal at Fountain Grove Conservation Area in Linn County.

## Early Migratory Bird Seasons Set

At its April meeting, the Conservation Commission set the following early migratory bird seasons:

» **Sora and Virginia rails:** Sept. 1 through Nov. 9 (70 days), with a daily limit of 25 and a possession limit of 75 (combined total for both species).

» **Wilson's (common) snipe:** Sept. 1 through Dec. 16 (107 days), with a daily limit of eight and a possession limit of 24.

» **American woodcock:** Oct. 15 through Nov. 28 (45 days), with a daily limit of three and a possession limit of nine.

» **Mourning doves, Eurasian collared doves, and white-winged doves:** Sept. 1 through

Nov. 9 (70 days), with limits of 15 daily and 45 in possession (combined total for all three species).

» **Blue-winged teal (BWT), green-winged teal, and cinnamon teal:** Population status of blue-winged teal — the primary species harvested during Missouri's September teal season — will not be known until summer. If the BWT breeding population index is below 3.3 million, the season will be closed. If the BWT breeding population index is at least 3.3 million but less than 4.7 million, the season will be Sept. 6 through 14 (nine days). If the BWT breeding population index is 4.7 million or greater, the season will be Sept. 6

through 21 (16 days). If there is an early teal season, the limits will be six daily and 18 in possession.

## Join the Conservation Facebook Community

If you aren't one of the more than 390,000 people who have seen information on the Conservation Department's Facebook page in the past month, you are missing one of the best experiences the Internet has to offer. Facebook members who "like" [facebook.com/MDCOnline](https://www.facebook.com/MDCOnline) get updates that connect them to things like a live video feed from a peregrine falcon nest, local fishing events, and biologists visiting bear dens to count cubs. It's a great place to keep up with Conservation Department activities and exchange information with other Facebook fans about where and how to fish, hunt, find mushrooms, hike, or take nature photos. It's also an excellent way to trade ideas about conservation issues, hear others' points of view, and tell the Conservation Department what you think about its programs. The best thing about becoming a fan of the Department's Facebook page is joining a community of people who are excited about nature and outdoor activities. The Department's Facebook page currently has more than 91,000 fans. Members of our Facebook community monitor one another's posts to maintain a respectful, family-friendly atmosphere where everyone feels welcome and comfortable sharing their thoughts. Join this thriving virtual community and join the fun!

## Find Fish With Free Mobile App

The Conservation Department has developed a free mobile app to help anglers find fish. Created for Android devices, iPhones, and iPads, the Find MO Fish app's geo-location feature can guide you right up to fish-attractor locations. Find MO Fish also includes a "Best Bets" location feature for certain fish species. You can view regulations for specific fish species and locations and get detailed information on various species through the included Fish Guide. The free app will even show you how to obtain fishing permits and give you access to annual fishing prospects and weekly fishing reports for many Missouri lakes, rivers, and streams. Learn more and download our Find MO Fish app at [mdc.mo.gov/node/15421](https://mdc.mo.gov/node/15421).

(continued on Page 8)





## CONSERVATION COMMISSION ACTIONS

The June Commission meeting featured presentations and discussions regarding a national overview of chronic wasting disease (CWD) and deer health issues, proposed regulation changes related to captive-deer facilities, and comments on the proposed regulation changes. A summary of actions taken during the June 5–6 meeting for the benefit and protection of forest, fish, and wildlife, and the citizens who enjoy them includes:

» **Approved** Regulations Committee recommendations that will:

- **Require** the facility of a new permit applicant for Class I and Class II wildlife breeder or big-game hunting preserves to be double fenced. Existing facilities having the same permit holder will operate under existing fencing requirements. As with all the proposed amendments, the Commission is actively seeking public comment on fencing amendments.
- **Require** new applicants for Class I Wildlife Breeder Permits to hold white-tailed deer, white-tailed deer-hybrids, mule deer, or mule deer-hybrids (deer), to pass a written examination provided by the Department and have an on-site inspection prior to and after construction of the breeding facility as part of the application process.
- **Prohibit** importation of live white-tailed deer, mule deer, or their hybrids into the state.
- **Prohibit** the display of live deer other than as is listed on permits.
- **Prohibit** the construction of any new Class I or Class II wildlife breeding facilities for deer within 25 miles of a location where CWD-positive animal or animals have been confirmed by the Conservation Department.
- **Require** Class I and Class II wildlife breeders and big-game hunting preserves to test all mortalities of deer that are older than six months for CWD.
- **Require** Class I and Class II wildlife breeders that hold deer to report confirmed positive-disease results to the Conservation Department.
- **Require** Class I and Class II wildlife breeders to comply with a herd-disease response plan approved by the Conservation Department in the event that CWD is discovered.
- **Require** Class I and Class II wildlife breeders that hold deer to maintain participation in a United States Department of Agriculture-approved CWD herd certification program.
- **Establish** a stipulation that the Conservation Department can require additional disease sampling and testing during disease investigations or morbidity/mortality events at Class I and Class II wildlife breeders that hold deer.
- **Require** source herds for deer and elk at Class I and Class II wildlife breeder facilities that hold deer to be enrolled in a United States Department of Agriculture-approved CWD herd certification program.
- **Establish** a requirement for Class I and Class II wildlife breeders that hold deer to conduct an annual herd inventory in the presence of an accredited veterinarian during the annual inventory, the signature of an attending accredited veterinarian on herd records, individual animal identification, and individual animal documentation including results of CWD testing.
- **Set** a minimum period of time that records must be kept by Class I and Class II wildlife breeders that hold deer.

- **Prohibit** the propagation, holding in captivity, and hunting of hogs within a big-game hunting preserve unless already approved by a specific date.
  - **Set** a requirement for holders of Licensed Big Game Hunting Preserve Permits to conduct disease testing, report disease test results, maintain movement documentation, adhere to fencing standards, and comply with a disease response plan in the event CWD is discovered.
  - **Set** a minimum period of time that movement records must be kept by holders of Licensed Big Game Hunting Preserve Permits.
  - **Prohibit** the use of imported deer or elk (cervids) in a licensed big game hunting preserve.
  - **Prohibit** the construction of any new big-game hunting preserve within 25 miles of a location where a CWD-positive animal or animals have been confirmed by the Conservation Department.
  - **Require** source herds for deer and elk at big-game hunting preserves to be enrolled in a United States Department of Agriculture-approved CWD herd certification program.
  - **Establish** a requirement for more information within inventories and record keeping for cervids on big-game hunting preserves.
  - **Require** a minimum period of time that records must be kept for cervids on big-game hunting preserves.
- » **Approved** the sale of the 5-acre Brookfield Maintenance Center in Linn County.
- » **Approved** the purchase of land in Shannon and Texas counties that totalled 2,928 acres as additions to Sunklands Conservation Area (CA).
- » **Approved** the exchange of 59 acres of a disjunct tract of Sunklands CA in Shannon County for 205.5 acres in Franklin County and a lease of 1,241 acres in Cole County.
- » **Approved** entering into a contract with Martin General Contractors, L.L.C., Eolia, Mo., for the construction of the Conservation Commission Headquarters Ground Coupled Heat Pumps for C, D, and F Buildings project in Cole County.
- » **Approved** entering into a contract with Cannon General Contractors, Inc., Troy, Mo., for construction of the Rocky Forks Lake CA Range Upgrade project in Boone County.
- » **Approved** the Fiscal Year 2015 Internal Expenditure Plan.
- » **Approved** the advertisement and sale of estimated 939,003 million board feet of timber on 331 acres on Compartment 14 of Indian Trail CA in Dent County.
- » **Approved** the advertisement and sale of estimated 948,000 board feet and 1,068 cords of timber on 415 acres on Compartment 5 of Birch Creek CA in Shannon County.

The next Conservation Commission meeting is July 10 and 11.

For more information, visit [mdc.mo.gov/node/3430](http://mdc.mo.gov/node/3430) or call your regional Conservation office (phone numbers on Page 3).

(continued from Page 7)

## Buy Permits and Check Game With MO Hunting App

The Conservation Department will release a new mobile app this summer called MO Hunting. This free mobile app will be available in the Google Play and iTunes stores for use with both Android and Apple mobile devices. MO Hunting enables hunters and anglers to purchase and download annual hunting and fishing permits, as well as deer and turkey permits, directly from their mobile device. MO Hunting also gives hunters and anglers the ability to view all of their previously purchased permits.

Deer and turkey hunters can also use MO Hunting to Telecheck their harvest via an easy-to-use fillable form. A confirmation number will be sent back to their mobile device.

As with purchased permits, the new MO Hunting app allows hunters to view all of their previous Telechecks and the associated details.

Learn more, and watch for updates at [mdc.mo.gov/node/28397](http://mdc.mo.gov/node/28397).

## Apply for Managed Deer Hunts by July 31

Deer hunters have until July 31 to apply online for most managed hunts. For more information, visit [mdc.mo.gov/node/3867](http://mdc.mo.gov/node/3867). Hunters may apply individually or as a group of up to six, except for youth-only hunts. For these, youths may apply singly or with one other youth. Be sure to have the nine-digit Conservation ID number for each hunter. Contact your local MDC office if you don't have Internet access (phone numbers on Page 3). All successful applicants will be mailed an area

map and other information regarding their hunt. Resident or nonresident managed deer hunting permits are required. Permits will be available to successful applicants anywhere permits are sold.

## New Commissioner Credits Mentors for his Conservation Commitment

David W. Murphy, nominated to serve on the Missouri Conservation Commission, is a living example of what outdoor mentorship can accomplish. He says he wants to pay forward the gifts he has received.

Gov. Jeremiah "Jay" Nixon announced the nomination June 4. If confirmed by the Missouri Senate, Murphy would serve a term ending June 30, 2019.

Murphy, 59, is a Lewis County native. He owns and operates a 376-acre farm in Clark County, where his family has been farming since 1857. He grew up driving a tractor, tending hogs and cattle, and hunting and fishing with his family.

Murphy earned a Bachelor of Science degree in forest, fisheries, and wildlife and a master's degree in wildlife management, both from the University of Missouri, Columbia. After college he worked as a regional director and field supervisor for the National Wild Turkey Federation. He recently retired from a 10-year stint as executive director for the Conservation Federation of Missouri (CFM). In 2009, *Outdoor Life* magazine named Murphy one of 25 Most Influential People for the Future of Hunting and Fishing.

Murphy grew up in a hunting and fishing family. One of his earliest childhood memories is being carried by his father on a coon hunt.

Conservation agents who were family friends also played key roles in shaping his life goals. Bob King would go on to become chief of the Conservation Department's Protection Division. Phil Rice later served as Protection Division supervisor in northwest Missouri. Then there was Conservation Agent Dean Novel.

"Dean was a profound influence on me because of the guidance he gave me," says Murphy. "I told him one day I wanted to be a conservation agent just like him. He told me I was doing pretty well in school, so I ought to become a biologist." At the time, only a high school diploma was required to become a conservation agent.

Murphy also credits his third-grade teacher, Mrs. Bowen, for encouraging his budding interest



## WHAT IS IT?

### American Lotus | *Nelumbo lutea*

American lotus is an aquatic plant that can cover large areas. They occur in oxbow lakes, sloughs, and ponds, preferring still waters with a mud bottom. Flowers bloom June through September and grow up to 8 inches across. Large colonies of the plant are important nurseries for fish and other aquatic life as well as shelter for ducks. Although the plant regularly produces seeds, it spreads mainly through its thick rhizomes that grow along the pond bottom. Despite its ornamental qualities, American lotus should not be introduced into most fishing ponds. Lotus spreads rapidly in shallow water and can soon completely cover a pond. —photograph by Noppadol Paothong



**David W. Murphy has been appointed to the Conservation Commission.**

in nature. She noticed his keen interest in animals when he was just a first-grader and gave his teacher, Mable Walker, a copy of *The Wild Mammals of Missouri* by Charles and Elizabeth Schwartz for him to use while learning to read. That book, with its wealth of lifelike illustrations and details about the lives of animals, fired his imagination.

"I don't know where I would be today without those folks who took an interest in me when I was young," says Murphy, "but you can bet I wouldn't have been able to do as much as I have."

When he retired earlier this year, Murphy had business cards printed up proclaiming his new title — citizen.

"I think that's the most honored title a person can have," he says. "It was citizens who had the love of nature, the vision and the drive to pass a constitutional amendment in 1936 removing conservation from political control. It was citizens who decided to amend the constitution again 40 years later to provide stable funding for their conservation department."

Murphy notes that a huge majority of Missourians approve of the job the Conservation Department is doing. He wants to persuade the minority that conservation is a wise investment in the future. "We owe them an explanation, some understanding of why conservation has value. We have to explain it well enough so it makes sense to people if we want it to continue. I think my background has positioned me pretty

well to be that standard bearer. I feel a great obligation to ensure that this world is as good

a place as I can leave it for my grandson and for other grandsons and granddaughters out there."

## DID YOU KNOW?

*Conservation makes Missouri a great place to fish.*

### Resources for Anglers

- » Missouri is blessed with more than a million acres of surface water and most of it provides great fishing. More than 200 different fish species are found in Missouri. The state's more than 1.1 million anglers pursue more than 25 popular game fish species.
- » Conservation enriches Missouri's economy and Missourians' quality of life. Fishing in the state generates more than a billion dollars for local communities and the state's economy, and supports thousands of jobs.
- » Public fishing areas are available in every county in Missouri. Many state-owned fishing areas also have special facilities for anglers with disabilities.

#### **Discover Nature — Fishing** | [mdc.mo.gov/node/27175](http://mdc.mo.gov/node/27175)

This free, hands-on fishing instruction helps kids ages 7–15 and families gain the skills and confidence to go fishing on their own. Contact your local Conservation office about classes in your area (phone numbers on Page 3).

#### **Find MO Fish App** | [mdc.mo.gov/node/15421](http://mdc.mo.gov/node/15421)

This free mobile app shows you the locations of public boat ramps on major lakes, rivers, and streams. The map also shows the exact location of underwater fish structures established by the Conservation Department. To help anglers find the best locations, the app includes the annual prospects and weekly fishing reports for select bodies of water.

#### **Fishing Reports and Prospects** | [fishing.mdc.mo.gov](http://fishing.mdc.mo.gov)

The Conservation Department's statewide weekly fishing report provides fishing conditions for most of the state's lakes, rivers, and trout parks. Updates are published from April through September. You will also find information from Department biologists on populations, creel surveys, and other fisheries research for more than 135 bodies of water.

#### **Fishing How-Tos** | [mdc.mo.gov/node/2475](http://mdc.mo.gov/node/2475)

Browse fishing tips by species, learn to fish, and prepare your catch for cooking.

#### **Fishing Regulations** | [mdc.mo.gov/node/6108](http://mdc.mo.gov/node/6108)

For information on permits, fish ID, and more, view or download a copy of the Department's *2014 Summary of Missouri Fishing Regulations*, or pick up a copy where permits are sold or at Department offices.

#### **Regional Fishing Events** | [mdc.mo.gov/node/252](http://mdc.mo.gov/node/252)

Browse news and events, and explore information about fishing, destinations, conservation education, and volunteer opportunities on the Department's regional pages.

#### **Conservation Areas Atlas** | [mdc.mo.gov/atlas](http://mdc.mo.gov/atlas)

The online Conservation Areas Atlas contains information about lands the Conservation Department owns, leases, or manages for public use.



*(continued from Page 9)*

## Join the Conversation on CWD

Missourians have a deep and abiding connection to nature. This commitment to forests, fish, and wildlife is so much a part of our heritage that the Show-Me State's citizens have twice amended their state constitution to ensure the future of the wild resources so near to their hearts. In 1936, through an initiative petition drive, they created a nonpolitical, science-based conservation agency, and in 1976 they voted to create a one-eighth of 1 percent sales tax earmarked for conservation work.

Because they care so deeply about things natural, wild, and free, Missourians were justifiably alarmed when chronic wasting disease (CWD) was found in commercial captive-deer breeding and hunting facilities in Linn and Macon counties in 2010 and 2011. CWD threatens Missouri's treasured hunting heritage, the millions of pounds of food deer hunting puts on family dinner tables, and the \$1 billion annual boost that white-tailed deer provide for Missouri's economy.

The Conservation Department responded to this threat with swift action to determine the extent and severity of the CWD outbreak. The disease — which is not known to affect humans but is always fatal to infected deer — was found to be confined to a small area along the northern border of Linn and Macon counties. Armed with this information, conservation officials designated a CWD Containment Zone and enlisted the help of landowners and hunters in reducing the potential for the disease to spread. This required reducing deer population density in the zone. This voluntary effort has been a significant sacrifice for landowners, many of whom are hunters themselves. While difficult, this sacrifice is consistent with Missouri's reputation for conservation leadership.

The Conservation Commission recently took the next step in meeting the CWD threat. This involves regulatory measures to ensure that CWD is not spread between captive and wild deer and extending the ongoing CWD monitoring of free-ranging deer to captive deer. The Conservation Department intends to work with the



captive-deer industry — just as it does with fish farmers, the forest-products industry, commercial fishermen, and trappers — to ensure the future of white-tailed deer and the traditions and businesses they support. The Department needs your involvement to succeed. You can get

involved by expressing your opinions and desires on the attached comment card and by becoming informed about CWD. For more information, visit a Conservation Department office or go online to [mdc.mo.gov](http://mdc.mo.gov), [www.cwdinfo.org](http://www.cwdinfo.org), or [www.knowcwg.com](http://www.knowcwg.com).



# MISSOURI DEER HUNTING: *Opportunity for All*

EACH YEAR, DEER HUNTERS WITH DISABILITIES AND VOLUNTEERS FROM ACROSS THE STATE REUNITE TO SHARE LAUGHS, STORIES, AND HUNT DEER.

BY SARAH KENDRICK

Brandon Huber, of Perryville, and wife, Jocelyn, have attended the Swan Lake Disabled Hunt for five years. "Hunting Swan Lake is a good opportunity to try and get a record buck," Huber said.



**ARRIVED AT THE MARK TWAIN LAKE** Disabled Hunt on a frigid November morning prepared to have my faith restored in humanity. It may sound too dramatic to be true, but having attended the hunt the previous five years, I knew what I was in for: a day of smiles, stories, and one happy deer camp.

Upon arrival, I was promptly dispatched to a holding tent. Volunteers, layered in coveralls and hunter orange, shivered around a space heater with hands jammed in pockets. They waited for a telltale rifle shot.

A few hundred yards away, James Dean, of Union, and his son and hunting buddy, James Dean II, were also shivering in a blind, waiting for a chance to take that rifle shot and harvest a deer. However, when I joined them I was met with warm smiles and a lot of enthusiasm.

"I found out about this hunt through a Mark Twain Lake brochure," said Dean. "I was walking with a cane then, and I knew it was only a matter of time." Dean was diagnosed with multiple sclerosis in 1997 and is now in a wheelchair. He has participated in the Mark Twain Lake Disabled Hunt every year since 2004.

"It's just been amazing. I have M.S., and I don't



**Bob Kendrick of Monroe City and Shelly Howald of the U.S. Army Corps of Engineers have organized volunteer support and administered the Mark Twain Lake Disabled Hunt together since 1988.**

want to burden anyone taking me hunting. I don't get a deer every year, but if I see deer, it's a bonus."

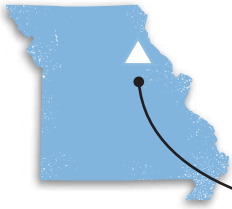
### **Mark Twain Lake Disabled Hunt**

The Mark Twain Lake Disabled Hunt is the longest-running hunt of its kind in the state. It is hosted and administered by the U.S. Army Corps of Engineers and hundreds of volunteers. Hunters are transported to accessible deer blinds by a team of volunteers and picked up when they are ready to return to camp, or when they harvest a deer.

Participants and volunteers are provided with meals and the option to sleep inside the group campground's canvas-sided pavilion, which features a massive stone fireplace at its center. The fireplace houses a roaring, cheerful fire all weekend, and the pavilion serves as the hunt's headquarters — a warm area where the hunts are organized, stories are told, and reunions shared.

Nearly all disabled hunts in the state are restricted to participants who require the use of a wheelchair, but the Mark Twain Lake hunt also welcomes hunters who use other mobility aids, such as braces, crutches, walkers, or canes. This accommodates hunters like Bill Harrison of St. Ann, who broke his back and cannot walk far unassisted. He is touched by

SARAH KENDRICK



**Hunter James Dean and his son, James Dean II, discuss the hunt in an accessible volunteer-built deer blind at the Mark Twain Lake Disabled Hunt.**





the volunteers' dedication.

"Most of the volunteers here are hunters themselves — that's phenomenal," said Harrison. "They're willing to give up a third of their hunting season every year."

Shelly Howald of the U.S. Army Corps of Engineers and Bob Kendrick, of Monroe City, have organized the Mark Twain Lake Disabled Hunt since the first hunt in 1988, when one hunter with disabilities from Monroe City was taken hunting.

"When I was young, one of my father's friends

was paralyzed," Howald explained. "I saw that he couldn't do what we could do outdoors. This hunt gives me an outlet and an opportunity to help others participate in outdoor activities that I wasn't able to do with a friend."

Kendrick works year-round to drum up financial and volunteer support for the hunt, recruit locals to build accessible blinds, and plant food plots. He works especially hard to provide a consistent source of good-natured teasing and laughs throughout the weekend.

"When the hunters arrive, the word 'disability' disappears. They're just hunters," Kendrick said.

**Bill Harrison loads his firearm and waits for a big buck in an accessible deer blind built by volunteers at the Mark Twain Lake Disabled Hunt.**

## ➤ Get Involved

For more information about participating in or volunteering at a managed deer hunt for people with disabilities, contact your regional Conservation office (phone numbers on Page 3), or see the *2014 Fall Deer and Turkey Hunting Regulations and Information* booklet available at hunting permit vendors, or on our Deer Regulations page at [mdc.mo.gov/node/3610](http://mdc.mo.gov/node/3610).

## Statewide Opportunities

Managed hunts for people with disabilities are held in most regions of the state, providing opportunities for more than 200 hunters annually. These hunts are held on public lands owned by the Missouri Department of Conservation, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service. Managed hunt partnerships between the Department and these





**Jack Young, a volunteer for 13 years, entertains a group of volunteers as young as 9 years old. "These hunters and volunteers are amazing. They're family," Young said.**

federal agencies, with the help of countless volunteers, provide high-quality deer hunting experiences for all Missourians — with or without disabilities.

Many Department-owned conservation areas also provide accessible hunting blinds or hunting access by reservation, as well ADA-accessible facilities to accommodate waterfowl hunting, archery, shooting, fishing, picnicking, and other outdoor activities. Find an area near you by visiting the Department's Conservation Area Atlas online at [mdc.mo.gov](http://mdc.mo.gov) (click on Conservation Areas) or by calling your regional office (phone numbers on Page 3).

### **The Power of Volunteerism**

While I shivered in the volunteer tent, I spoke with volunteers who ranged in age from 11 to "old enough." I was taken aback when the kids told me their ages, because it was hard for me to imagine myself volunteering on a frosty morning at that age. Josh Underhill, 13, of Monroe City, was already a seasoned volunteer, having helped with the hunt since he was 9 years old.

"I like hunting, and I want these hunters to experience the same thing I get to," Underhill said.

Nathan Mehrer, 14, also of Monroe City, is

a first-time volunteer, but he says he's attended the hunt nearly his whole life. "I just want to let other people enjoy what I enjoy. It's a family thing for me."

The hunt marked Kenny St. Clair's fourth year as a volunteer. He was motivated to help after his daughter was born with a disability. "I do it because I love hunting and helping people. A lot of people have helped me along the way. My daughter was born with a heart defect, so it's a way to give back. We enjoy being out here with volunteers helping out."

The theme of family is very strong at the hunt. Diana McKinney, the proudly self-proclaimed first female cook at the hunt, bustles around the makeshift outdoor kitchen prepping onions for huge vats of coleslaw.

"This is my Christmas," said Diana. "I really enjoy it. It touches my heart, and there is no greater feeling."

Nearby, Tera Kisar, of Monroe City, works amid the steaming fryers with her father, cooking meals for the hunters and volunteers.

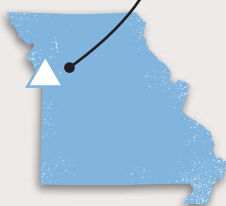
"My grandpa was the head chef out here for 14 years. I've worked out here for as long as I can remember," Kisar said. "I plan on bringing my kids [to the hunt], too."



## ➤ Smithville Lake Disabled Hunt

by Bill Graham

Nearly two hundred miles away on the same chilly morning, the Smithville Lake Disabled Hunt is underway. This hunt is the largest disabled hunt in Missouri, offering 65 disabled blind locations, and is a partnership between the U.S. Army Corps of Engineers, Clay County Parks and Recreation Department, and the Conservation Department. The Kearney Boy Scouts provide breakfast on Saturday, echoing the citizen involvement of all disabled hunts in the state.



"This hunt helps us manage our deer herd at the lake in the parks and refuge areas that are off-limits to regular hunters," said Derek Dorsey, park manager for the U.S. Army Corps of Engineers.

All disabled hunts in Missouri allow relatives, friends, or volunteers to assist hunters at the blinds. Volunteers become good friends with hunters, and the event becomes an outdoor reunion for participants.

"I love this hunt," said hunter Wally Parker, 53, of St. Louis County, who participates in several managed hunts in Missouri. The former Marine lost a leg and some mobility in his arms in a motorcycle accident. "I thought my hunting days were through. Then I found these hunts."

An 11-point buck bagged at this Smithville Lake hunt was the biggest deer Parker has taken in recent years. Volunteer Bill Davidson, of Lathrop, helped him bag the buck. Davidson said his father had a disability, so volunteering at the hunt holds extra meaning for him.

"I just enjoy it," Davidson said. "I've been coming out and helping for eight or nine years now."

William Hall, 32, of Wardell, enjoys a chance to hunt and renew friendships. He has participated in several of the hunts statewide for those with mobility challenges.

"This is a better hunting opportunity," Hall said. "We don't have the deer numbers at home that you do up here. This is my fourth year here, and I've made some good friends, and it's good to see them every year."



**Colonel Blanford, right, hunts with his brother, Dave Blanford, of Kansas City.**

Lending a hand to hunters is a privilege, said volunteer Pete Eisentrager, of Independence.

"It's an opportunity to spend time with these guys and give a little back," Eisentrager said.

Dave Blanford, 66, of Kansas City, began deer hunting in 1978. More than a decade earlier, paralysis prompted him to begin using a wheelchair. But that didn't keep him from the outdoors and deer hunting. His brother, Colonel Blanford, helped him set up in a blind at Smithville Lake. Dave Blanford cradled his bolt-action rifle and surveyed the corn stubble and brushy draws in front of the blind.

"This is peaceful out here," Blanford said. "You're out here with the birds and the trees, and it's peaceful."

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*Bill Graham is a lifelong outdoorsman and Department media specialist for the Kansas City and Northwest regions. He enjoys the outdoors whether wielding camera, rod, gun, or hiking stick.*

## Creating Opportunities

Multiple opportunities exist for hunters with disabilities in Missouri, but the demand grows. Kendrick encourages more communities to start disabled hunts.

"We have volunteers who would be willing to skip our hunt for a year or two to help other communities organize and set up their own disabled hunts," he said. "We could help folks build blinds and give them pointers that we've learned through the years."

Missouri's disabled hunts are a testament to the spirit of Missouri's outdoor community. This

is evident not only in the hunters who don't allow a disability to hinder their passion for the sport, but also in the countless hours of volunteer support that make these events possible.

When asked why Kendrick continues to organize the hunt, he doesn't hesitate. "I see what this hunt does not only for the hunters, but for the helpers, and it's powerful.... You can't walk away from that." ▲

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*Sarah Kendrick is the outreach and marketing supervisor for the Conservation Department's Wildlife Division. She lives in Columbia.*



# *Emeralds* *of the Ozarks*

Rare and beautiful  
dragonflies of Missouri

BY BOB GILLESPIE

PHOTOGRAPHS BY RICHARD DAY

A male **Hine's emerald dragonfly**  
perched in Barton Fen, Reynolds County.  
The Hine's emerald is listed as endangered  
at both federal and state levels.





# Here be dragons.

**Winging silently over** murmuring Ozark streams; fluttering above open pastures and meadows on midsummer dawns, their wings glittering in the eastern light; found tucked away in some forgotten forested cove, a cool spring seep found there to call home; or skimming just above the treetops looking to feed on a warm still evening.

“Here be dragons” the map would read. In the country around Marcoot, Bixby, Salem, Eminence; around the slopes of the St. Francois Mountains; to the lower reaches of the Current River; for many of them the eastern Ozarks is home.

Dragons, indeed. Patrolling, feeding, they often live short, violent, wing-tattered flight seasons defending territories, searching for mates, laying eggs, and succumbing to their place in the food chain.

## Hine’s Emerald Dragonfly

Hine’s emerald dragonfly is one of Missouri’s rarest dragonflies. It is listed as endangered both at the federal and state levels. Hine’s emerald dragonfly is so imperiled because it occupies Ozark fens, a specific wetland type that is itself rare in Missouri. This dragonfly belongs to the Corduliidae family, which contains 384 species, 39 of which are Somatochlora; 26 occur in the United States.

Hine’s emerald dragonfly has brilliant green eyes, dark metallic green coloration to the thorax, and an overall imposing matte black body, and two distinct yellow “tiger stripes.” Adults of the species are nearly 3 inches in body length and have a wingspan approaching 4 inches.

All the emeralds are aquatic insects that spend the majority of their lives developing in wetland habitats as an aquatic nymph or larvae. Hine’s emerald dragonfly may spend from two to four years in the larval stage. The dragonflies that we observe on-wing are the adult stage, and for Hine’s emerald dragonfly this stage may only last five to six weeks. This is the last stage of the dragonfly’s life, and the stage responsible for reproduction.

The surprising thing about Hine’s emerald dragonfly larvae is that they spend a great deal of time in crayfish burrows. Crayfish burrows are often abundant in Ozark fens and are characteristically tremendous deep warrens of subterranean tunnels filled with water. Scientists believe that the larvae seek refuge in the burrows, especially as the dry days of summer and fall cause the water to dry up in the fens. The developing Hine’s emerald dragonfly larvae retreat deeper and deeper into the tunnels, moving with the water table to survive.

Dragons, yes, but not the fire-breathing sort that have a predilection for piles of men’s treasures and pretty maidens. The Emeralds of the Ozarks are a group of dragons with compound eyes — extraordinary sensors with more than 30,000 individual lenses, allowing them to be adept hunters of aerial insects. They are equipped with phenomenal visual senses that are sensitive to some parts of the spectrum that man cannot discern.

So these dragons, these Emeralds of the Ozarks, are a group of dragonflies belonging to the genus *Somatochlora*. Known fondly as the Emeralds, they are named for their brilliant, emerald green eyes. Six *Somatochlora* species have been documented in Missouri. We will introduce you to four of them: Hine’s emerald dragonfly (*Somatochlora hineana*), Ozark emerald (*Somatochlora ozarkensis*), mocha emerald (*Somatochlora linearis*), and clamp-tipped emerald (*Somatochlora tenebrosa*). The other two species, fine-lined emerald (*Somatochlora filosa*) and treetop emerald (*Somatochlora provocans*), are seldom observed in Missouri.



Hine’s emerald dragonfly is a species restricted to areas where limestone or dolomite bedrock lies close to the surface. They occupy wetland habitat types characterized by sandy or marly saturated soils, wetlands that are typically associated and sustained by free-flowing springs. Ozark fens, prairie fens, forested fens, seeps, marshes, and sedge meadows are natural communities that support populations of Hine’s emerald dragonfly. Wetland destruction and fragmentation of suitable habitats are recognized as the main reasons for this species’ endangerment.

Hine’s emerald dragonfly populations are distributed within the eastern Ozarks. This emerald can be observed in pastures that have perennial spring-fed swampy ground with crayfish burrows.





## *Clamp-Tipped Emerald*

Clamp-tipped emerald is a close sister species to Hine's emerald dragonfly, and it is often difficult to tell them apart unless you study their terminal appendages (tip of the tail end of the body), which just happen to be clamp shaped. The adults of clamp-tipped emerald also have a flight season that begins in the waning stages of the flight season of Hine's emerald dragonfly. The lives of most Hine's emerald dragonfly adults have run their course as the hot days of July arrive in Missouri. The short flight season (5 to 6 weeks) of Hine's emerald dragonfly typically starts in May and peaks in June; clamp-tipped emeralds live longer and may be observed into the early fall months.

Clamp-tipped emeralds are slender, dark brown dragonflies with clear wings and swashes of green and bronze reflections to the head and thorax. Clamp-tipped emerald can be observed along small, quiet, flowing Ozark streams and near seeps, springs, and in the same fen habitats as Hine's emerald dragonfly. Clamp-tipped emerald is more tolerant of brush and trees and can be found readily along wooded stream corridors and forested seeps. This emerald tends to flutter over standing water, often about boot-top high, and can be observed hovering in shade and sun-dappled areas of fens or streams, seemingly disappearing and reappearing as one's eyes try to adjust to the contrast. But when seen, their eyes seem to be backlit with an iridescent piercing green.

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*Emeralds are not choosy when it comes to prey,* pursuing and feeding upon insects (and other flying organisms) that are nearly as large as them, and eating one of their own species is not off the menu. Emeralds routinely feed on the gnats and flies that one might encounter on a walk through a hay field or observe along a stream on a float trip. They are adapted for dynamic feeding efficiency.

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### ***Mocha Emerald***

Mocha emerald is a more common emerald that prefers dark, tree-lined streams. It can be observed feeding along stream corridors and shaded openings, or in nearby fields or yards, singly or in feeding flights, in the late afternoon until dusk. Mocha emeralds have a chocolate or mocha-colored thorax that has a greenish iridescence but no distinctive yellow tiger stripes like Hine's emerald dragonfly. Females can be observed tapping the tip of their abdomen directly into the wet mud or shallow water at the edges of streams or puddles — ovipositing (laying eggs). Males will patrol segments of streams looking for females and prey of opportunity.



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*Emeralds are aerial acrobats. Situated in the order Odonata, they represent an ancestral form of insect flight. These dragons have two pairs of wings that can beat independently, allowing pinpoint flight directional changes. They are highly maneuverable and adept at intercepting other flying prey, capturing and often consuming them as an inflight meal.*

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## ***Ozark Emerald***

Our most secretive emerald, Ozark emerald is a dragonfly that is not well known to the scientific community. It has been collected sparingly in Missouri and, although sought after, it is seldom seen.

Ozark emerald appears to use very small perennially spring-fed streams in forested habitats. Very limited adult and larval surveys have been conducted for the species in Missouri. Their life history is not fully known, and the population size and habitat requirements are still being researched. Although both males and females have been captured, their larvae have not been observed in Missouri. There is much to be learned about this uncommon dragonfly.

The Ozark emerald can be observed in feeding flights in the late afternoon or at dusk, often over forest roads and open fields, sometimes at tree-top height but occasionally close to the ground. It is smaller than its sister species, has a distinctive terminal appendage, has white to cream thoracic striping, and their eyes have more blue than the other Missouri emeralds.

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So keep a keen eye about you, because here be dragons. They are the beautiful, rare, and secretive Emeralds of the Ozarks. ▲

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**Bob Gillespie** is a natural resources coordinator with the Illinois Natural History Survey. Formerly the Missouri Department of Conservation's natural history biologist for the Southeast Region, he was the recovery leader for Hine's emerald dragonfly. Bob currently chases the beep and promising static of radioed prairie chickens, the dragonfly net set aside for a time. **Richard Day** is an adjunct research associate in zoology with the Illinois State Museum and has researched Hine's emerald dragonflies in Illinois and Missouri since 2007. He has been a professional photographer for 30 years.





# CATFISHING

## MISSOURI'S BIG RIVERS

*Learn to navigate  
and fish the  
Missouri and  
Mississippi rivers.*

BY ROSS DAMES AND MIKE REED

PHOTOGRAPHS BY DAVID STONNER

CATFISH HAVE BEEN AN IMPORTANT RESOURCE of the big rivers for a long time. A journal entry by a member of the Lewis and Clark party, Patrick Gass, mentions catfish caught by the expedition from the Missouri River in Nebraska, August 25, 1804:

*“Two of our men last night caught nine catfish that would together weigh three hundred pounds. The large catfish are caught in the Missouri with hook and line.”*

Arguably, the grandest fishing trip of all time started on the Missouri River in May 1804. [▶](#)



A flathead catfish caught from the Mississippi River near Hannibal.



Catfish are so important to Missourians that the Missouri legislature designated channel catfish as the state fish. A recent national survey of fishing and hunting reported that Missouri anglers pursued catfish more than any other kind of fish except black bass. However, a survey conducted by the Department of Conservation found that only 11 percent of catfish anglers fished the Missouri and Mississippi rivers, even though these rivers are teeming with three major catfish species (blue, flathead, and channel catfish), offering the best opportunity to catch a large fish.

So why do so few catfish anglers fish Missouri's big rivers? Some may find these rivers intimidating. Others may believe these large rivers are too challenging to fish successfully.

At times, big rivers can be dangerous, especially during inclement weather or extreme floods. Fishing in strong current and deep water takes a different approach than typically used in smaller waters. However, with preparation and experience, nearly anyone with an adequately-sized boat can safely navigate and successfully fish Missouri's prized rivers for catfish.

## Our Big Rivers

The Missouri and Mississippi rivers are Missouri's most important water resources. They account for 29 percent of Missouri's total surface water acreage, more than the combined area of the state's 15 largest reservoirs. Both rivers are greatly altered from their original state; confined by dams, levees, dikes, and rock-lined shorelines to facilitate flood control, commercial navigation, drinking water, agriculture, and hydropower.

The lowermost 553 miles of the Missouri River run through Missouri before joining the Mississippi River near St. Louis. The Mississippi River forms the Show-Me state's eastern boundary for about 490 miles. The uppermost 176 miles includes a series of seven navigation locks and dams.



NOTHING COMPARES TO PLAYING  
TUG OF WAR WITH **LARGE CATFISH**  
DETERMINED TO SWIM TO THE BOTTOM OF THE RIVER.

## Big River Safety

- » Wear a life jacket!
- » Avoid commercial barges. Barges cannot make sudden stops or turns and often produce large wakes. Always steer your boat into a large wake rather than taking it on broadside.
- » Look for navigation hazards like wing dikes, rock structures, submerged debris, sandbars, and buoys. Identify submerged hazards by "reading the water." Any change in the water surface pattern usually indicates submerged structures.



- » Operate at slow speeds when outside the navigation channel, which is marked by red and green buoys.
- » Anchor with the bow upstream and keep a knife near the anchor rope to cut the anchor free in an emergency.
- » Be mindful of jumping Asian carp, especially when operating in areas with slow current.

Both rivers provide a variety of habitats for catfish ranging from shallow backwaters with log piles to deep holes off rock dike tips. Learning to fish these rivers can be exciting and rewarding.

## Catfish Hangouts

Blue catfish, flathead catfish, and channel catfish can often be found alongside one another when they concentrate in deep water below dikes, in dam tailwaters, or in the mouths of tributary streams. During summer months,



they can be found around dikes, along drop-offs, near woody structure, and along rocky banks. However, blue catfish prefer areas with significant current near dike tips, below dams, or near the main channel.

When pursuing **blue catfish** in the Mississippi River, Chris Morrow, an avid catfish tournament angler from Troy, suggests concentrating on lock and dam tailwaters during early spring when water temperatures range from about 50 to 60 degrees. Set an anchor so that the boat is just within casting distance of your target location. Try setting up along a current seam, an area where swift and slow water are adjacent, just

below the dam or near a deep scour (a hole caused by swiftly moving water). As water temperatures warm into the mid-60s, Chris moves downstream and looks for areas near structures or for deep scours. Target scour holes by anchoring the boat upstream so that your bait drifts to just where the sides of the hole drop to the bottom. Barges that have been sitting idle for an extended time are also good spots for blue catfish during summer. Anchor upstream so that the bait settles just underneath the barge. Look for the same types of areas on the Missouri River, especially along rocky banks on outside bends, around trail dikes and wing dikes (look especially for notched

**Both the Missouri and Mississippi rivers provide a variety of habitats for catfish.**





Channel  
catfish

## CHANNEL CATFISH PREFER AREAS WITH SLOW CURRENT BETWEEN DIKES, IN BACKWATERS AND SIDE CHANNELS, AND NEAR SHORE BEHIND DIKES.

dikes), and scour holes. Target deep holes during the coldest months.

**Channel catfish** can be found in a wide variety of habitats. They prefer areas with slow current between dikes, in backwaters and side channels, and near shore behind dikes. They often use shallower water than blue catfish and flathead catfish. Shallow sand flats can be very productive during the summer.

**Flathead catfish** like deep pools with slow current where they feed along the bottom at night, which makes them more difficult to catch. They occupy many of the same habitats as blue catfish but are far more cover-oriented than blues. Flathead catfish prefer cut banks, dikes, and backwaters with an abundance of woody cover such as logjams. Concentrate on woody or rock structures near sunset and sunrise to increase your odds of landing one of these elusive river cats.

Because these rivers are massive and offer a wide variety of catfish habitat, locating active fish is not always easy. On a recent trip, Chris was quick to point out that catfish are wary, so

approaching potential hangouts quietly is critical. And regardless of when or where you're fishing, if nothing happens in 30 minutes, move to another spot.

### Catfishing Gear and Tactics

**POLE AND LINE** The same methods used to catch catfish on lakes and reservoirs are effective on big rivers. Rod and reel, trotlines, limb lines or bank poles, and jug lines are used successfully by big river anglers. Although anglers may select a method based on a specific fishing situation or target species, the tactic employed is largely a matter of personal preference. Rod and reel fishing and trotline fishing are clearly the most popular methods used in big rivers.

The typical pole and line rig for blue catfish and flathead catfish includes a 7- to 10-foot medium-heavy or heavy-action rod matched with a heavy-duty bait-casting or spinning reel loaded with 30- to 50-pound monofilament line. Chris prefers 80-pound braided line for targeting blue catfish. For tight-line fishing, terminal tackle should include a 3- to 8-ounce slip sinker, just enough to keep the bait down, threaded on the main line between the rod tip and a two-way swivel. A lighter leader, Chris uses 50-pound monofilament, about 18 inches long, is attached to the bottom of the swivel. This leader will break below the swivel should you become snagged, making re-rigging much quicker, especially if you have several rigged replacement leaders ready. Hook style and size varies, but most catfish anglers use 6/0 to 8/0 circle hooks. Circle hooks eliminate the need to "set the hook." Just start reeling when a fish picks up the bait and the hook will set itself. If, like Chris, you prefer the thrill of the hook set, use a "Kahle" style or straight shank hook. This same basic setup works well for channel catfish, just downsize everything. You may need to change hook style depending on your bait choice.

Although tight-line fishing has been the go-to rod and reel method for river catfish, drift fish-



Terminal rigging for drift fishing consists of a leader about 30 inches long with two 8/0 or 12/0 circle hooks spaced 18 inches apart. A sinker is attached to the end of the leader with the lowermost hook tied about 6 inches above the sinker.



**Trotlines are constructed of a strong main line with multiple drop lines with hooks placed at intervals. A large dip net makes boating cats much easier, especially large fish.**

ing in the main channel, primarily for blue catfish, has become a popular summer tactic in recent years. Terminal rigging for drift fishing consists of a leader about 30 inches long with two 8/0 or 12/0 circle hooks spaced 18 inches apart. Attach a 12- to 24-ounce sinker to the end of the leader and tie the lowermost hook about 6 inches above the sinker so that it fishes just off the bottom. Drop the line over the side of the boat and keep the line as vertical as possible so the sinker bumps along the bottom without dragging as the boat drifts downstream at about 1 mph. Use a strong trolling motor or an outboard to maintain this drift speed. Constant adjustments to the amount of line out is necessary because water depth changes as the boat drifts, but maintaining a vertical alignment will keep the bait near the bottom and minimize frustrating hangups.



**TROTLINE** For those who think catching catfish on a trotline is not fun, think again! Nothing compares to playing tug of war with large catfish determined to swim to the bottom of the river.

Trotlines are constructed of a strong main line with multiple drop lines with hooks placed at intervals. Although they can be purchased, experienced “trotliners” construct their own using very sturdy materials. Lines can be constructed in several ways but, generally, consist of a main

**Drop lines can be removable using a spring clip tied to one end of the drop line**



line (#60 nylon braid works well) 100-150 feet long. Lighter drop lines 18-24 inches long are placed 3-4 feet apart along the main line. Drop lines can be permanently attached or removable using a spring clip tied to one end of the drop line. A large hook, circle hooks are preferred, is tied to the other end of the drop line. A large barrel swivel placed above the hook helps prevent line twist. A quick Internet search will reveal several methods for constructing trotlines.

A weight heavy enough to hold the line on the bottom is placed at one end of the main line while the other end is tied to a solid object like a rock or tree on the bank. Sometimes a weight is placed in the middle of the main line. Pieces of scrap iron or old window weights work well. Lines placed on the bottom off dike tips along the current seam are often very productive. Lines may also be strung between trees and suspended just below the water's surface.

Live and cut bait work well on trotlines. Many trotliners use live sunfish or goldfish, hooked through the back, especially when fishing deep holes holding large blue catfish and flathead catfish. When using cut bait, try using small pieces threaded on the hook. This technique will help prevent the bait from spinning in the current and wrapping the drop line around the main line.

**Herring, shad, and other baits are usually cut into small pieces and referred to as "cut bait." Both live and cut bait work well on trotlines.**



## Free River Fishing Guide

For a handy guide to Mississippi River fishing, visit the Lower Mississippi River Conservation Committee's website at [lmrcc.org/programs/fishing-the-lower-mississippi-river-initiative](http://lmrcc.org/programs/fishing-the-lower-mississippi-river-initiative). Much of this information also applies to the Missouri River.

A large dip net makes boating cats much easier, especially large fish. Wearing angler-style gloves may seem an inconvenience but makes it much easier to handle lines and fish. A pair of needle-nose pliers makes hook removal easier.

Lines set and baited near dusk and picked up early the next morning are often most productive. The longer a line goes unattended, the greater the chance of losing fish.

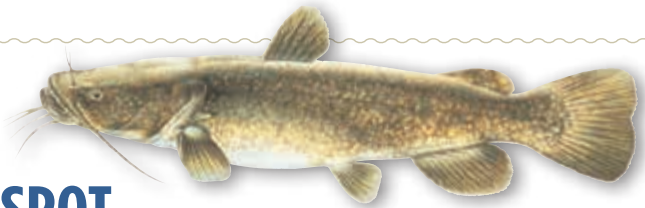
Managing trotlines on rivers poses safety concerns not encountered on lakes, so anglers should never set or run lines alone. One person should operate the boat to keep tension off the main line while another works the line. A sudden change in current or the boat's position can slide a line through your hand and result in an embedded hook. Keep a sharp knife within reach should you need to cut a line quickly.

**BAITS** Skipjack herring is the preferred bait for blue catfish. Gizzard shad are also popular and easier to collect. Experienced catfishers agree that fresh bait is best and use frozen bait only when fresh is unavailable. Vacuum sealing bait will help preserve some freshness when freezing is necessary.

Herring, shad, and other baits are usually cut into pieces and referred to as "cut bait." Although bighead and silver carp may not be used as live bait, they can be used as cut bait. Chris loads the hook with as many pieces of bait as the hook will take.

Live herring, shad, and sunfish can be effective for blue catfish, too. Flathead catfish prefer live bait such as large minnows, goldfish, sunfish, and bullheads. Run the hook through the fish's back just below the dorsal fin or through both the upper and lower lips. Channel catfish will take a variety of baits including ribbed rubber worms dipped in stink or blood baits, dough baits, night crawlers, grasshoppers, chicken liver, small fish,

REGARDLESS OF WHEN OR WHERE  
YOU'RE FISHING, IF NOTHING HAPPENS  
IN 30 MINUTES, **MOVE TO ANOTHER SPOT.**



Flathead catfish



cut bait, and even hotdogs. Rig with a treble hook when using liver or dough bait.

Clearly, there are many variations on the pole and line and trotline techniques described here. Many devoted big river catfishers also offer additional advice and guidance through several online resources and outdoor publications. For information on permits, regulations, and more, visit the Department's Fishing page at [mdc.mo.gov/node/89](http://mdc.mo.gov/node/89) or pick up a copy of *A Summary of Missouri Fishing Regulations* at your local permit vendor.

Experience the thrill of wrestling one of Missouri's big river cats, and claim your share of one of our state's grandest fishing opportunities. ▲

***Ross Dames** grew up along the banks of the Mississippi River near Hannibal and has been a Department fisheries management biologist in the area for 18 years. **Mike Reed** first fished the Mississippi River near Cape Girardeau for catfish as a youngster, and he has been a Department fisheries management biologist in southeast Missouri for 15 years.*



## Eastern Tiger Swallowtail

SUMMER CAN BE a tough time to sit in a photo blind, due to stifling heat and hungry ticks, so I often shift my effort to morning hikes in search of eye-catching insects on colorful flowers. I was on just such a hike last summer when I ran across this tiger swallowtail (*Papilio glaucus*) perched atop a gorgeous coneflower.

The eastern tiger swallowtail is the only swallowtail in Missouri with yellow and black stripes. Some females are yellow with black stripes, similar to males; others are black with darker black stripes. Both female forms have blue scales on the dorsal (top) side of the hindwings. They have a wingspan of 2½–4½ inches.

Adults may be found flying in forests, fields, and gardens. Host plants for the larvae include hop tree, tulip tree, and various species of ashes, apples, and cherries. Adults drink nectar from a variety of flowers. Males are more likely than females to “puddle” (sip liquid and accompanying salts from puddles or damp soil). Eastern tiger swallowtails are found throughout Missouri from late March into October.

Insect and flower photography is a welcome respite from my typical pursuit of mammals and birds, which requires an 18-pound rig, including camera, 500 mm lens, and tripod, all slung across my shoulder, often for several miles. When looking for insects, I carry the same camera, but with a much smaller 300 mm lens. I still use a tripod for every shot, but one that is half the size and weight of my standard support. The 5-foot minimum focus distance of the 300 f/4 lens is perfect for scenes such as this one, and if I need a closer look, I simply attach a 1.4x lens extender.

Once I close in on a butterfly, I consider the sun’s angle and my point of view to the subject. Unless I’m going for a special effect, such as rim lighting, I try to position myself with the sun to my back. The sun’s rays become a natural flash, illuminating the darker features of the butterfly. As for point of view, I position my lens at eye level with the subject. Shooting at a downward angle to an animal rarely results in a pleasing composition.

Next, I wait for the butterfly to position itself on the flower for the best shot. Often, this requires patience because some butterflies can be downright uncooperative! Also, I keep in mind that the plane of focus of a 300 mm lens is typically less than a quarter-inch deep at close range, so I wait for the butterfly’s wings to fold upward before I release the shutter. This helps to achieve better focus on each wing, and highlights the patterns and colors of the particular species.

Finally, I check for extraneous clutter that might show up in the image after processing. It is easy to overlook an intrusive stem from a neighboring plant when looking through the lens, but it will become obvious as a distracting blur in the final image.

I hope these tips will help the next time you run across a tiger, of the swallowtail variety, during your own photographic adventures.

—Story and photograph by Danny Brown

 300mm lens • f/5.6 • 1/100 sec • ISO 400

*We help people discover nature through our online field guide.  
Visit [mdc.mo.gov/node/73](http://mdc.mo.gov/node/73) to learn more about Missouri’s plants and animals.*







## Niawathe Prairie Conservation Area

*Located in southwest Missouri, this Dade County remnant prairie is home to more than 300 plant species and a few uncommon animals.*

NIAWATHE IS AN Osage Indian word meaning “life-giver.” The 320-acre Niawathe Prairie Conservation Area is the result of a partnership in land ownership — half of the area is owned by The Nature Conservancy and the other half by the Missouri Department of Conservation. Three-quarters of the area was declared Niawathe Prairie Natural Area in the late 1970s, due to the remarkably diverse mix of grassland plants, flowers, and wildlife that is reminiscent of Missouri’s extensive pre-settlement prairie.

Prior to the Department’s management, much of this prairie was grazed lightly and hayed annually. The area has never been plowed or seeded with cool-season grass like fescue. Recent management has included prescribed burning and grazing, which are practices used to mimic historical disturbances, like wildfires and grazing by bison, which helped shape the evolution of prairies over thousands of years.

Niawathe Prairie is known for its extremely diverse plant community. That makes plant identification a busy hobby, because many species of wildflowers bloom throughout the summer. Early in the season, Indian paintbrush blooms, followed by cream wild indigo and pale purple coneflower in June, and royal catchfly and various species of blazing star in July. Late summer and fall usher in a variety of asters and goldenrods. These showy plants are the easiest to identify; hundreds of others are available for viewing and identification.

Due to the diversity of plant life of this remnant prairie, a variety of wildlife flourishes. The prairie mole cricket is a fairly uncommon insect that depends on prairie habitat and calls this



Trumpet beard-tongue

17–40mm lens • f/11 • 1/100 sec • ISO 800 | by Noppadol Paothong

area home. These insects spend most of their lives in burrows underground and are rarely seen, but their call can be heard in the spring. Populations of regal fritillary butterflies and Northern crawfish frogs can also be seen and heard. All three of these animals are species of conservation concern, which means that they are monitored closely because their populations have declined severely over the last 50 years or so, mainly due to the loss of prairie habitat.

Birders also enjoy this prairie. Species that are uncommon in much of rural Missouri, but are abundant on grasslands like Niawathe, include Henslow’s sparrows, grasshopper sparrows, and loggerhead shrikes. Late winter usually yields a significant population of short-eared owls.

—Kyle Hedges, area manager



**Recreation opportunities:** Bird watching and nature viewing. This area is closed to hunting, fishing, and trapping.

**Unique features:** Extremely diverse example of pre-settlement native prairie.

**For More Information** Call 417-895-6880 or visit [mdc.mo.gov/a7410](http://mdc.mo.gov/a7410).



# MDC DISCOVER nature

# 6

## IDEAS FOR FAMILY FUN

To find more events near you, call your regional office (see Page 3), or visit [mdc.mo.gov](http://mdc.mo.gov) and choose your region.

### SUMMER SERVICE SLAM 2014

**JULY 12 • SATURDAY • 8 A.M.–1 P.M.**

*St. Louis Region, Powder Valley Conservation Nature Center, 11715 Cragwold Rd., Kirkwood, MO 63122*

*Registration required, online at [missioncontinues.org/summerserviceslam](http://missioncontinues.org/summerserviceslam)*

Powder Valley has been selected for this year's Summer Service Slam Project by The Mission Continues. This nonprofit organization redeploys veterans to serve here at home by finding new missions that harness their skills and dedication. For one day this July, their mission will be Powder Valley. Veterans will work alongside civilian volunteers of all ages on a variety of projects to improve the nature center.

### ADULT SUMMER CAMP: ARCHERY

**JULY 15 • TUESDAY • 6–8 P.M.**

*Kansas City Region, Anita B. Gorman Conservation Discovery Center, 4750 Troost Ave., Kansas City, MO 64110*

*Registration required, call 816-759-7300*

*Ages 18 and older*

Remember shooting a bow and arrow at summer camp as a kid? Bring your friends

and relive the fun as you learn the basics of shooting a compound bow. There will be plenty of time for shooting and fun games to provide friendly competition.

### FAMILY FISHING

**JULY 19 • SATURDAY • 9–11 A.M.**

*Kansas City Region, Burr Oak Woods Conservation Nature Center, 1401 MW Park Rd., Blue Springs, MO 64015*

*Registration required, call 816-228-3766*

*All ages, families*

We will teach fishing basics, provide equipment and worms, and then let you and your family try your luck. Kids will be entered in a drawing at the end of the summer for a new fishing pole and tackle box. For more information, email [burr.oak@mdc.mo.gov](mailto:burr.oak@mdc.mo.gov).

### FROG GIGGING CLINIC

**JULY 25 • FRIDAY • 6:30–11 P.M.**

*Central Region, Blind Pony Hatchery, 16285 BP Hatchery Dr., Sweet Springs, MO 65351*

*Registration required by July 22, call 573-815-7901, ext. 3388.*

*All ages, families*

Learn the basics of frog-gigging safety, equipment, identification, and regulations, as well as how to clean your catch to take home and cook. The class will have the opportunity to go frogging with the help of Department staff.

### SHOAL CREEK PARTNERSHIP CLEAN-UP

**JULY 26 • SATURDAY • 8 A.M.–1 P.M.**

*Southwest Region, Wildcat Glades Conservation and Audubon Center, 201 W. Riviera Dr., Suite B, Joplin, MO 64804*

*Registration required, call 417-629-3423 beginning July 1*

*Ages 10 and older (Ages 10–17 must be accompanied by an adult.)*

Join Missouri/Kansas conservation partners for this canoeing cleanup along Shoal Creek from Grand Falls to Schermerhorn Park in Galena, Kansas. A limited number of canoes will be available to adults and teens with canoeing experience.

### MUSIC MAPLES

**JULY 31 • THURSDAY • 6 P.M.**

*Central Region, Runge Conservation Nature Center, 2901 West Truman Blvd., Jefferson City, MO 65102*

*No registration • All ages*

Join us for an open-air summer concert featuring Kansas City musicians Michael Fraser and Tenley Hansen on mandolin, violin, and guitar. Michael and Tenley will use storytelling, live music, and a variety of visual aids to relay the importance of maple trees to Missouri.



## DISCOVER NATURE PHOTO CONTEST

Show the world your idea of discovering nature in Missouri. Using your Google+, Instagram, or Twitter account, tag your Missouri nature photos with “#MDCdiscovernature.” Your photos will appear on our website at [mdc.mo.gov/node/26255](http://mdc.mo.gov/node/26255), where you can also read the contest rules. Every month, Department staff will select and post a winning photo. We'll publish all of the monthly winners in the January 2015 issue of the *Conservationist*.





Subscribe online • [mdc.mo.gov/node/9087](http://mdc.mo.gov/node/9087) • Free to Missouri households



## I Am Conservation

James Chrisco and his wife, Barbara, stand on a part of their farm near Salem dubbed the Kay Branch fens by the Missouri Hine's Emerald Dragonfly Recovery Team. This parcel of land, which is a complex of Ozark fens that are located in the valley of Kay Branch that flows through the Chriscos' farm, is one of the most important habitats for the Hine's emerald dragonfly in the state, according to Bob Gillespie, former natural history biologist for the Missouri Department of Conservation and Hine's Emerald Dragonfly Recovery Team leader. The Hine's emerald dragonfly is a federally endangered species. "We conducted a mark-recapture study where we marked every Hine's emerald dragonfly that we could capture and release at one of his fen sites," said Gillespie. "We captured over 300 individuals, which is simply jaw-dropping for Missouri." The typical number could be counted on one hand — for the whole survey season. The secret to the success of Chrisco's land is his grazing practices with his herd of goats. The goats keep the fens from becoming overgrown, and they don't like to get their feet wet, so they avoid the wetlands. "The dragonfly has open meadows to forage in and perfect wetland habitats for reproduction," said Gillespie. The Chriscos befriended the recovery team and allowed them to monitor the fens at their discretion. James Chrisco said the land has been in his family for generations. "It has been a joy having people around," said Chrisco. "It got me to noticing things that I took for granted for many years. I was really impressed by how many dragonflies they found. It was overwhelming. It just makes you happy to see something like that.... I figure they were put here for a reason, and I want them to stay." —*photograph by Noppadol Paothong*